

# Sexual Efficacy of Adolescents, Permissiveness, and the Transition Toward Nonvirginity: From Intention to Behavior<sup>1</sup>

TOON W. TARIS<sup>2</sup>

*Department of Social and  
Organizational Psychology  
Utrecht University  
Utrecht, The Netherlands*

GÜN R. SEMIN

*Department of Social Psychology  
Free University  
Amsterdam, The Netherlands*

The current study examines teenage sexual behavior (in terms of having had sexual intercourse) as a function of sexual attitudes and sexual efficacy. At the heart of the study lies the assumption that sexual attitudes such as permissiveness are related to sexual behavior, but that this relation is stronger for sexually efficacious teenagers than for others. Using longitudinal data from 253 British adolescents, a structural equation model is tested and fit. The results provide partial support for the expectations, demonstrating the usefulness of sexual efficacy in predicting sexual behavior. Limitations and implications of the study are discussed.

This study examines how *sexual efficacy* defined as the degree to which one feels self-confident regarding sexual issues, influences the relations between adolescent sexual attitudes/intentions and their sexual behavior. Numerous studies (e.g., DeLamater & MacCorquodale, 1979; Jessor & Jessor, 1975; Miller & Olson, 1988; Reiss, 1967; Sneddon & Krenan, 1992; Taris & Semin, 1995, 1997a) have documented the strong impact of sexual attitudes (such as sexual permissiveness and intended courtship behaviors this concerned the likelihood that one would try to engage in particular sexual activities with someone one had just met) on adolescent sexual experience. However, it is interesting to note that measures tapping the degree to which one feels confident to be able to convert one's intentions into behavior have seldom been included in the analyses. Yet, there is strong empirical as well as theoretical evidence that the degree to which attitudes and intentions translate themselves into actual behavior is moderated by self-efficacy. For example, Ajzen and Madden's (1986) revision of the theory of reasoned action (Ajzen & Fishbein, 1980) proposes that the effect of the intention to engage in a particular behavior on the occurrence of that behavior is moderated by locus of control (Rotter, 1966). Given a particular intention, the corresponding

<sup>1</sup>This study was supported by the ESRC, Grant XA44250008.

<sup>2</sup>Correspondence concerning this article should be addressed to Toon W. Taris, Department of Social and Organizational Psychology, Utrecht University, P.O. Box 80.140, NL-3508 TC Utrecht, The Netherlands. e-mail: t.taris@fss.uu.nl.

outcome is more likely to be realized if one believes that one can influence the likelihood of occurrence of that outcome (see Grob, Flammer, & Wearing, 1995, for a recent discussion).

It is likely that self-efficacy is also important in predicting teenage sexual behavior. As Loewenstein and Furstenberg (1991) argue, teenage sexual behavior is difficult to predict from rational choice models, because having sex is a dyadic event. If one party is not yet willing to have sex while the other party is, the question becomes which party is most likely to realize their intention and why this is so. Further, even if both parties share the same attitudes and intentions, it does not follow that the desired outcome will be attained; teenagers may simply be too shy to make it clear to each other that they want to have sex (or not). Conversely, if one of the parties is able to "take the initiative" while the other is not, it seems plausible that the first party is more likely to turn his or her intentions into actions than the other party (Darling, Davidson, & Passarello, 1992). This reasoning suggests that inclusion of adolescents' sexual self-efficacy may improve the degree to which teenage sexual behavior can be explained from sexual attitudes and intentions. It appears that sexually efficacious adolescents will convert their intentions much more readily into sexual activities than others. Thus, sexual efficacy is expected to moderate the relationship between own sexual attitudes and intentions on the one hand, and sexual behavior on the other.

This position is consistent with evidence gained from research on condom use of adolescents and gay/bisexual people (cf. the reviews by Fisher & Fisher, 1992, and Sanderson & Jemmott, 1996). Recently, Rotheram-Borus, Reid, Rosario, and Kasen (1995) have shown that efficacious gay persons were more likely to abstain from risky sexual practices or to use condoms than less efficacious persons. Similarly, Sanderson and Jemmott (1996) demonstrated that adolescents who participated in an intervention intended to boost their efficacy were more likely to use condoms than were members of a control group who had not experienced this intervention. Thus, it appears that in this area, the moderator effect of efficacy on the relation between attitudes and behavior has been established, suggesting its usefulness in the prediction of the transition toward nonvirginity as well.

The current research examines these ideas in the context of a longitudinal study among 253 British adolescents aged 14 to 18 years old. Using data from two occasions, a structural equation model was tested, linking attitudes and intentions (sexual permissiveness and the intention to engage in particular courtship behaviors: to adolescent sexual experience (i.e., whether one is still a virgin). The effects between these two sets of variables were presumed to be moderated by the participants' sexual efficacy.

Figure 1 presents the hypothesized relations among the variables used in this study in the form of a path diagram. The adolescent's sexual experience is expected to be positively affected by the presence of a steady boyfriend or girlfriend. Although adolescent sexual intercourse does not occur exclusively in

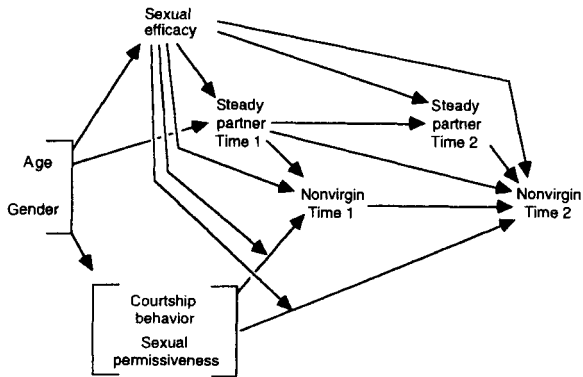


Figure 1. Conceptual model for the expected structural relations among adolescent sexual intentions, sexual efficacy, and sexual experience. Arrows pointing to arrows denote interaction (moderator) effects (i.e., the strength of the relation between attitudes and intentions, and sexual experience is expected to vary as a function of sexual efficacy).

the context of a steady partner relationship (Taris & Semin, 1997a; Tr an & Lewin, 1992), the presence of a steady partner will increase the likelihood that one is (or will become) nonvirgin, as one important precondition for having sex (the availability of a potentially willing partner) is satisfied.

Further, sexual value orientations are expected to affect sexual experience. Previous research has shown that sexual behavior is closely connected to sexual values, such as sexual permissiveness and courtship intentions (Taris & Semin, 1997b). The main interest in this study, however, lies in the presumed moderator effects of sexual efficacy. For sexually efficacious teenagers, the effects of sexual values on sexual experience are expected to be stronger than for others, as the first group is more likely to act in concordance with their values. This suggests that sexually efficacious adolescents will on average be less often virgins than others, as many teenagers (especially boys) seem to strive to lose their virginity early (Carroll, Volk, & Hyde, 1985; Taris, Semin, & Bok, 1998). Finally, the model includes measures of the adolescents' gender and age. Both variables are linked to attitudes and sexual behavior, and therefore it is important to control their effects.

## Method

### Sample

The data were collected as part of a two-wave panel study. The waves of the study were conducted respectively in 1989 and 1990 in the area around Brighton and Hove, Sussex, England. Random location sampling was used to obtain a sample that had similar socioeconomic characteristics to the populations of

Brighton and Hove. To this aim, the ACORN classification system developed by CACI (1989) was adopted. The ACORN system divides neighborhoods into groups based on similarities (e.g., income, education, household type). The key assumption behind this system is that "birds of a feather flock together"; that is, that people living in the same neighborhood are comparable in terms of their socioeconomic characteristics. The ACORN system divides the Brighton and Hove area in 603 equally large geographical districts. Of these, 594 contained resident population, and the average number of households within each of these 594 districts was 340. The remaining districts contained virtually no population. For each of these districts, many census variables are available, such as age, income, gender, and household type. The ACORN classification system takes into account 40 such variables. A cluster analysis on the basis of these variables allows each of these districts to be characterized in terms of its "typical" inhabitant; conversely, people can be categorized according to the type of residential area in which they live (CACI, 1989).

Participants were recruited at secondary schools in the Brighton and Hove areas. They were randomly selected from the school administrator's files, with the constraint that the final sample should represent the population of 14- to 18-year olds in the Brighton and Hove areas, at least concerning age and gender. If a teenager was willing to participate in the study, his or her parents received a letter explicating the subject, goals, and importance of the study. Then their consent was requested regarding their child's participation in the study. Teenagers were not interviewed without parental consent.

In total, 450 adolescents were contacted. This resulted in a sample of 333 adolescents (74.0%) who participated in the first wave of the study. They completed a structured questionnaire administered individually in the presence of an interviewer. The introduction to the questionnaire emphasized that all information they provided would be treated confidentially. The questionnaire itself addressed, among other things, sexual behavior, intimate relationships, courtship behavior, attitudes toward sex-related issues, and background variables including age and gender. Comparison of selected ACORN characteristics of the sample with data on the characteristics of all households in Brighton and Hove did not reveal major differences between the two. Thus, there was no reason to assume that the sample was not representative for the target population. Nonresponse at the second wave decreased the sample to 253 adolescents (129 males [51%],  $M_{\text{age}} = 15.80$ ,  $SD = 1.08$ ). Analysis of the nonresponders showed that attrition was not systematically affected by religion, political preference, or any of the variables employed in the current study.

#### *Variables*

*Sexual efficacy.* The main interest in this study concerns the degree to which adolescents felt able to ask several sexually sensitive questions to a hypothetical

person whom they had been seeing for about 3 months, to whom they felt attracted, and with whom they may have wanted to have sexual relations, without damaging this relationship. The questions were "Are you going out with somebody else?"; "Do you mind us using condoms?"; "Have you ever had an AIDS test?"; "Have you ever had a sexual relationship with someone of your own sex?"; and "How many sexual partners have you had?" and were rated on a 7-point scale ranging from 1 (*would feel unable to ask this question*) to 7 (*would not hesitate to ask this question*). The reliability (Cronbach's  $\alpha$ ) of this scale (Cronbach, 1986) was .80 at Time 1 and .77 at Time 2.

*Sexual permissiveness.* This concept was tapped by means of two separate scales. (a) *Morality in having sex:* This is a six-item scale with a reliability (Cronbach's  $\alpha$ ) of .70. Typical items are "It is all right to have sex before marriage if the partners love each other"; "It is acceptable to have sex with somebody you have met recently and don't know very well, as long as both of you are attracted to each other"; and "Adultery is sinful under all circumstances" (reverse scored; 1 = *disagree strongly* to 7 = *agree strongly* for all items). (b) *Importance of loving the partner before having sex:* This six-item scale taps the degree to which one feels that in an intimate relationship particular conditions have to be fulfilled before it is acceptable to have sex in that relationship. Sample scale items are "I would have to be married to the person"; "I would have to be in a long-term, committed relationship with the person"; and "I would have to be in love with the person" (1 = *yes*, 0 = *no*). This scale was shown to constitute a good Guttman scale, with a reliability of .80 (*r*). This scale is referred to as the *Need to Love* scale. This scale is reversed; thus, a high score indicates that the participant feels that love is not necessary to have sex with someone.

*Time 1/Time 2 sexual experience.* Whether the participants were virgins was assessed by asking them whether they had ever had sex with anyone (0 = *no*, 1 = *yes*). This question was asked at both time points. At the first occasion, 36% of the adolescents had already had sex. One year later, this figure was 61%.

*Courtship behaviors.* In the current study, the perceived likelihood or intention to engage in particular courtship behaviors was measured, rather than the actual behavior itself. The precise wording of the question is

Imagine that you are at a disco one evening and meet somebody. You are mutually attracted to each other. You have a wonderful evening and you don't want it to end. How likely would you be to do each of the following things?

After which, a list of several activities follows, such as "try to have sexual intercourse," "masturbate each other," "find a place where we can be alone and possibly make love," and "go home with them." Responses ranged from 1 (*not at all likely*) to 7 (*very likely*). The reliability of this seven-item scale is .84.

Table 1

*Means (and Standard Deviations) on the Variables Used in This Study, for Adolescents With Low and High Scores on Sexual Efficacy*

Variables	Low efficacy ( <i>N</i> = 126)	High efficacy ( <i>N</i> = 127)
Sexually experienced at Time 1 (%)	26	47***a
Sexually experienced at Time 2 (%)	52	70***a
Steady partner at Time 1 (%)	55	73***a
Steady partner at Time 2 (%)	60	77***a
Courtship behaviors	1.46 (0.61)	1.57 (0.71)
Sexual permissiveness		
Sex morality	4.37 (1.23)	4.48 (1.11)
Need to love	0.57 (0.24)	0.50 (0.27)*
Age adolescent	15.68 (1.07)	15.86 (1.10)*
Male (%)	51	50 <sup>a</sup>

<sup>a</sup>This is a proportion rather than a mean. The chi-square test used to test differences between groups. See text for statistics.

\**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

*Steady partner.* The participants had to indicate whether they had a steady boyfriend/girlfriend at Time 1 (score 1) or not (score 0). This variable was included, rather than a measure asking whether the respondent had "ever" had a steady boyfriend/girlfriend, because all participants said that they had had a steady partner relationship in the past. This concept was also measured at Time 2.

*Other variables.* Apart from the variables mentioned earlier, this study included measures of the participants' gender and age.

Table 2 presents the correlations among the variables used in this study. To obtain insight into the effects of sexual efficacy, the sample was divided into a low (*N* = 126) and a high sexual efficacy group (*N* = 127). Table 1 presents the means and standard deviations for the variables used in this study, for the low and high sexual efficacy groups separately. This table shows that sexually efficacious teenagers were more likely at both occasions to be nonvirgins than other teenagers were:  $\chi^2(1, N = 253) = 12.06, p < .001$ , Time 1;  $\chi^2(1, N = 253) = 16.70, p < .001$ , Time 2. This table also shows that, at both time points, they were more likely to have a steady partner relationship,  $\chi^2(1, N = 253) = 9.36$ , Time 1;  $\chi^2(1, N = 253) = 8.36, p < .01$ , Time 2. Thus, the behavior of the efficacious teenagers differed from that of nonefficacious teenagers.

Interestingly, there were hardly any differences between the groups on the attitudinal variables. The only significant difference was found on the Need to

Love scale,  $F(1, 251) = 4.75, p < .05$ , means were 0.50 for the high sexual efficacy group and 0.57 for the low efficacy group. Thus, it appeared that the differences between the groups on the behavioral variables (sexual experience and having a steady partner relationship) were considerably more important than the differences in attitudes and intentions.

### Results

The data were analyzed using structural equation modeling (Jöreskog & Sörbom, 1993). The variables in such models can be latent (i.e., they are functions of two or more other variables) or manifest (there is only one indicator for a particular construct). Structural equation modeling marries factor analysis to regression analysis, in that the model allows for a simultaneous estimation of a measurement model for the latent variables as well as a structural model for the relations among the variables. In structural equation modeling, the null hypothesis that a particular model will hold for the population is tested against the hypothesis that it will not. The degree to which a model fits the data is expressed in a chi-square value. A low value (relative to the number of degrees of freedom) indicates that the covariance matrix as expected on the basis of the model and the covariance matrix as observed for the data are very similar. If so, the model accounts well for the covariances among the variables, and the likelihood that it holds for the population is high. Conversely, a high chi-square value indicates that the model must be rejected. In judging the fit of the models, Bentler and Bonett's (1980) nonnormed fit index (NNFI) was also considered. NNFI is less susceptible to fluctuations in sample size than most other fit indexes, including the chi-square test (Marsh, Balla, & McDonald, 1988). Models must be rejected if NNFI is lower than .90 (Bentler & Bonett, 1980).

#### *Direct and Indirect Effects of Sexual Efficacy*

The model presented in Figure 1 was used as a null model. The moderator effects of sexual efficacy were omitted; these were examined in a separate analysis. The null model fitted the data quite badly,  $\chi^2(18, N = 253) = 87.58, p < .01$ , NNFI = .71. Inspection of the residuals suggests that the model did not account very well for the empirically observed covariance between Time 1 virgin status and Time 2 steady partner relationship. The errors of these two variables were correlated to obtain a better fit. This resulted in an acceptable,  $\chi^2(17, N = 253) = 26.66, p > .05$ , NNFI = .96. After omitting several nonsignificant effects, the final model yielded  $\chi^2(23, N = 253) = 37.28, p = .03$ , NNFI = .95. Figure 2 presents the standardized maximum likelihood estimates for the final model, in the form of a path diagram. Standardized effects can easily be compared and interpreted, as they are all expressed in the same scale; they range from -1 to +1, with 0 indicating no effect at all.

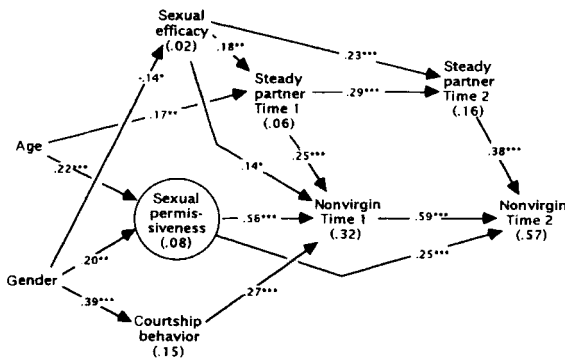


Figure 2. Standardized LISREL estimates for the final model, excluding interaction effects of sexual efficacy and structural effects only ( $*p < .05$ .  $**p < .01$ .  $***p < .001$ ) Standardized loading of Importance of Love = .72 (fixed for identification purposes) loading of Sex Morality = .75 ( $p < .001$ ). There were correlated errors between Time 1 sexual experience and Time 2 steady partner ( $-.37, p < .001$ ) and between courtship behavior and sexual permissiveness (.53,  $p < .001$ ).

Figure 2 shows that teenagers who reported to have a steady partner relationship were more likely to be nonvirgins than were participants who were without partners (standardized effects of .25 at Time 1, and .38 at Time 2,  $ps < .001$ ). These findings underline the significance of having a steady partner in making the transition toward nonvirginity.

Of the three attitudinal variables (sexual efficacy, sexual permissiveness, and courtship behavior), courtship behavior was the least important. Teenagers who intended to engage in all kinds of sexual activities if they were to meet a sexually attractive partner were more likely to be nonvirgins at Time 1 than others (an effect of .27,  $p < .001$ ). Considerably more important was sexual permissiveness. At both time points, there were quite substantial effects of permissiveness on sexual experience (effects of .56 at Time 1 and .25 at Time 2,  $ps < .001$ ). Sexually permissive teenagers were relatively likely to be nonvirgins at Time 1 and to become nonvirgins at Time 2. The third attitudinal variable, sexual efficacy, influenced participants' sexual experience indirectly, via effects on whether the participant had a steady partner relationship. Sexually efficacious adolescents were more likely to have a steady partner relationship at both waves of the study (effects of .18 at Time 1 and .23 at Time 2,  $ps < .01$ ). There was also a direct effect of sexual efficacy on Time 1 virgin status: Sexually efficacious teenagers were more likely to be nonvirgins (a small effect of .14,  $p < .05$ ).

Further, there were significant effects of gender on the three attitudinal variables. Boys were more permissive, more sexually efficacious, and more often planning to engage in sexual activities than were girls. Finally, older participants



Table 2

*Correlations Among the Variables (N = 253)*

Variables	1	2	3	4	5	6	7	8	9	10
1. Nonvirgin T2	—									
2. Partner T2	.24	—								
3. Nonvirgin T1	.61	.22	—							
4. Partner T1	.35	.33	.41	—						
5. Courtship behavior	.18	-.07	.07	-.06	—					
6. Sex morality	.30	.05	.27	.04	.43	—				
7. Need to Love	.40	-.03	.35	.07	.41	.54	—			
8. Sexual efficacy	.18	.28	.21	.19	-.04	.02	.08	—		
9. Age	.21	.13	.18	.18	-.12	.08	.10	.08	—	
10. Gender <sup>a</sup> (hi = m)	-.07	-.11	.01	-.12	.39	.10	.16	-.14	-.07	—

Note. Correlations of .12 or better are significant at  $p < .05$ . T1 = Time 1, T2 = Time 2.

<sup>a</sup>0 = female, 1 = male.

more often had a steady partner relationship at Time 1, and they were sexually more permissive than were others.

Figure 1 shows that the proportion of explained variance in the two most important dependent variables (Time 1/Time 2 virgin status) is fairly high (47% vs. 61%). The other variables in the model were considerably less well explained;  $R^2 = 2\%$  (for sexual efficacy) to 16% (for Time 2 steady partner).

This analysis revealed that the finding that the proportion of nonvirgins was different for the low and high sexual efficacy group (cf. Table 1) was largely attributable to the fact that sexually efficacious adolescents were more likely to have a steady partner relationship than were others. At both occasions, there was an indirect effect of sexual efficacy on sexual experience via the presence of a steady partner. Further, at Time 1 there was a direct effect of sexual efficacy on sexual experience. However, sexual efficacy was also assumed to moderate the effects of the other two attitudinal variables (courtship behavior and sexual permissiveness) on sexual experience. These moderator effects were examined separately.

#### *Moderator Effects of Sexual Efficacy*

The moderator effects of sexual efficacy on the effects of sexual permissiveness and courtship behavior were tested using the LISREL multiple-group

option. This procedure requires that two (or more) groups are created on the basis of the variable that is presumed to moderate the effects of other variables. A model is fitted to both groups; the fit of this model is computed across both groups simultaneously. Effects can be constrained to be equal across groups. The fit of a constrained model can be compared to the fit of the corresponding unconstrained model. If the constrained model fits the data significantly worse than the unconstrained model, this particular effect differs across groups (thus, the variable used to create the groups moderates this particular effect).

This procedure is straightforward and easy to implement at the cost, however, that the moderator variable is treated as a categorical variable. Although a continuous variable may be used to create the groups of interest, the information about the order of the categories of this variable is lost. Although this presents a drawback of the procedure employed here, the possibility of being able to test and compare the fit of models was considered more important.<sup>3</sup>

The model presented in Figure 1 (extended with a correlation between the errors of Time 1 virgin status and Time 2 steady partner) was estimated separately for the low ( $N = 126$ ) and high sexual efficacy group ( $N = 127$ ). No across-group constraints were imposed. Sexual efficacy was excluded, as this variable was constant within each group. As recommended by Jöreskog and Sörbom (1993), the variance-covariance matrix was analyzed. This analysis yielded  $\chi^2(32, N = 253) = 39.04, p > .05$ , NNFI = .96, indicating that the model fitted the data rather well. Inspection of the parameter estimates and the corresponding standard errors, however, suggests that many effects might well be equal across groups. This impression was tested by constraining the corresponding effects to be equal across groups, on a one-by-one basis. A significant decrease of the fit of the model was taken as evidence that an effect differed significantly across groups; that is, that this effect was moderated by sexual efficacy. Finally, nonsignificant effects ( $p > .05$ ) were omitted. The resulting model yielded  $\chi^2(61, N = 253) = 63.74, p > .05$ , NNFI = .97, indicating that this model fitted the data rather well.

The moderator analysis reveals that the results hardly differed across groups. Furthermore, comparison of these results to those presented in Figure 1 reveals that these were very similar. To avoid discussing the same set of results twice, only the differences between these two sets of results are discussed. Sexual efficacy was expected to moderate the effects of courtship behavior and sexual permissiveness on Time 1/Time 2 virgin status. As regards the effects of courtship behavior, these were not statistically different across the low versus high efficacy group. However, the effect of sexual permissiveness on Time 2 virgin status was

<sup>3</sup>Note that multiplicative interaction terms can also be included in structural equation models, much like ordinary regression analysis. However, inclusion of interaction terms in structural equation modeling greatly enhances the complexity of models, whereas one can no longer rely on the chi-square test and other fit indexes based on this test (cf. Baumgartner & Bagozzi, 1995). Therefore, we prefer the approach used here.

significantly weaker for the low sexual efficacy group (a standardized effect of .15,  $p < .05$ ) than for the high efficacy group (a standardized effect of .39,  $p < .001$ ). This also has implications for the proportion of explained variance in Time 2 virgin status: For the high sexual efficacy group, 61% of the variance in Time 2 virgin status was accounted for, whereas the corresponding figure for the low sexual efficacy group was 47%. This 14% difference was fully attributable to the differential strength of the effects of sexual permissiveness on Time 2 virgin status. No other effects differed significantly across groups.

### Discussion

The current study sought to enhance understanding of the relations among adolescent courtship behaviors and sexual permissiveness, sexual efficacy, and sexual experience. A longitudinal model was tested using structural equation modeling, drawing on data from 253 British adolescents. The effects of sexual attitudes (permissiveness and intentions to engage in particular courtship behaviors) on sexual experience were expected to be especially pronounced for the sexually self-efficacious teenagers, whereas for the others these effects would be significantly weaker. Further, levels of sexual activity (measured as the proportion of nonvirgins and the proportion of participants with a steady relationship) were expected to be higher among sexually efficacious teenagers.

The results provide partial support for these expectations. The lagged effect of sexual permissiveness on adolescent sexual experience was stronger for the sexually efficacious participants; this was also reflected in the proportion of explained variance in Time 2 sexual experience ( $R^2 = 47\%$  for the low efficacy group vs. 61% for the sexually efficacious group). Additionally, the level of sexual activity was also significantly higher for the sexually efficacious group, due to direct and indirect effects of sexual efficacy on sexual experience. Taken together, these results underline the significance of sexual efficacy in explaining teenage sexual behavior.

One unexpected finding concerned the strong relation between Time 1 virgin status and Time 2 steady partner. Teenagers who were nonvirgins at Time 1 were less likely to have a steady partner at Time 2. One interpretation of this effect is that teenagers who became nonvirgins at an early age may be less willing to commit themselves to a steady partner relationship; they may want to have the opportunity to engage in new (sexual) relationships whenever they feel like it. Alternatively, nonvirgins may experience more difficulties in finding a steady partner than virgins; potential partners may, for example, feel that nonvirgins are promiscuous, leading them to refrain from developing a relationship with them.

The current study has several limitations. First, all measures employed in this study were measured subjectively. While this does not present conceptual problems (indeed, one might argue that subjective perceptions must be preferred

to objective measures, as perceptions are causally closer to the phenomena to be explained than objective circumstances; Bronfenbrenner, 1977), it must be acknowledged that this may introduce bias in the data. People may be motivated to provide consistent answers, they may provide socially desirable answers, or they may provide answers that are consistent with one's self-image. Such processes may result in artificially high correlations among variables that were measured at the same wave of the study. For concepts measured at different occasions, artificially higher correlations among the concepts would seem less likely, given the 1-year period during the waves of the study.

Second, the measure of sexual experience employed in this study is rather crude; just a measure of whether or not one has already had sex. A more refined measure is conceivable, however. For example, one might devise an index in terms of the degree of intimacy of the sexual activities in which one has engaged. This would have the advantage of having more variance among the participants and thus of the possibility of a more precise prediction of the degree to which one is sexually experienced.

Third, the proportions of explained variance in the dependent variables were generally quite low (average  $R^2 = .19$ ; median  $R^2 = .15$ ). However, the amount of variance explained in the ultimate dependent variables (sexual experience at Time 1 and Time 2) was quite reasonable: 32% at Time 1, and 57% at Time 2. Thus, whereas the model did not account well for the variables that were assumed to influence teenagers' sexual experience, sexual experience itself was explained quite well.

Finally, the measures employed here were especially devised for the current study. Although at the time of drafting the questionnaires this presented the advantage of resulting in a relatively short questionnaire (which is important to obtain a high response rate, especially in longitudinal studies; see Taris, 1997, for a discussion), it also means that the results cannot readily be compared to studies employing other measures of the same concepts. This drawback, however, is only relative; within the current study, the operationalizations have proved to be effective.

While these are important limitations of the research reported here, results gained from this study might provide interesting insights into the sexual maturation of adolescents and of the joint role of attitudes, intentions, and sexual efficacy in this process. As expected, sexual efficacy was shown to play an important role in the timing of the transition toward nonvirginity.

The results have theoretical and practical implications for sex education programs and public-health efforts to curb teenage pregnancy. It seems important that young people are made aware of the fact that they themselves are the primary actors regarding the issue of whether or not to have sex. Previous research has demonstrated that boys are generally more anxious than girls to lose their virginity; whereas boys "never miss an opportunity," girls often intend to have sex only in committed relationships (Carroll et al., 1985; Taris & Semin, 1997a). This

suggests that especially girls may profit from counseling interventions aimed at increasing sexual efficacy. Indeed, whereas increasing boys' sexual efficacy may "backfire" (in the sense that they will become more successful in realizing their intentions to have sex as often and as early as possible), for girls an increased sexual efficacy may have the opposite result; namely, a delayed sexual initiation. This would be desirable, as early teenage sexual behavior is the primary cause for the relatively high number of unwanted pregnancies among teenagers. Thus, boosting girls' feelings of efficacy might have the added bonus of reducing the number of teenage pregnancies.

Post-hoc analysis provided some support for this reasoning. Probit analysis revealed a significant age by sexual efficacy interaction,  $t(1, 252) = 3.92, p < .05$ . Whereas 83% of the sexually inefficacious girls of 18 and over were nonvirgins at the second wave of this study, only 64% of the sexually efficacious girls had already lost their virginity. The difference between the proportions of nonvirgins was slightly smaller for younger girls (63% vs. 48%, respectively). These findings thus support the reasoning that increasing girls' sexual efficacy could curb teenage pregnancy. For boys, there was no effect of sexual efficacy on sexual experience.

Further, the current study suggests that campaigns aiming to influence teenage sexual behavior will be especially successful if one is able to increase the feelings of sexual self-efficacy of the target group. Previously it was shown that sexual attitudes have a strong effect on the timing of the transition toward nonvirginity and that this effect is even stronger for self-efficacious teenagers. Thus, it appears important to influence sexual efficacy in such campaigns, if only to increase their effectiveness. Again, it should be noted that increasing boys' efficacy might result in an unwanted increase in their sexual activities.

In summary, the current study underlines the importance of sexual efficacy in explaining the timing of the transition toward nonvirginity. Efficacious teenagers seem to be more successful in realizing their sexual intentions, both in terms of making a transition toward nonvirginity and in delaying that transition, as evidenced by effects of sexual attitudes on sexual behavior that were much stronger for self-efficacious teenagers than for their less efficacious counterparts. An interesting follow-up study might examine the antecedents of sexual efficacy. One promising line of study has focused on the role of parents. Elsewhere, researchers have demonstrated that parenting styles and efficacy are related (e.g., Gordon, Nowicki, & Wickern, 1981; Grolnick, Ryan, & Deci, 1991). How this process actually operates and whether it also generalizes to sexual efficacy remain to be examined.

#### References

- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

- Ajzen, I., & Madden, T. J. (1986). Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control. *Journal of Experimental Social Psychology*, **22**, 453-474.
- Baumgartner, H., & Bagozzi, R. P. (1995). Specification, estimation, and testing of moment structure models based on latent variables involving interactions among the exogenous constructs. *Sociological Methods & Research*, **24**, 187-213.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, **88**, 588-606.
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, **32**, 513-531.
- CACI. (1989). *ACORN user's guide*. London, UK: CACI Marketing Services.
- Carroll, Z. L., Volk, K. D., & Hyde, J. S. (1985). Differences between males and females in motives for engaging in sexual intercourse. *Archives of Sexual Behavior*, **14**, 131-139.
- Cronbach, L. J. (1986). *Essentials of psychological testing* (4th ed.). New York, NY: Harper & Row.
- Darling, C. A., Davidson, J. K., & Passarello, L. C. (1992). The mystique of first intercourse among college youth: The role of partners, contraceptive use, and psychological reactions. *Journal of Youth and Adolescence*, **21**, 97-117.
- DeLamater, J., & MacCorquodale, P. (1979). *Premarital sexuality: Attitudes, relationships, behavior*. Madison, WI: University of Wisconsin Press.
- Fisher, J. D., & Fisher, W. A. (1992). Changing AIDS-risk behavior. *Psychological Bulletin*, **111**, 455-474.
- Gordon, D., Nowicki, S., & Wickern, F. (1981). Observed maternal and child behavior in a dependency-producing task as a function of children's locus of control orientation. *Merrill-Palmer Quarterly*, **27**, 43-51.
- Grob, A., Flammer, A., & Wearing, A. J. (1995). Adolescents' perceived control: Domain specificity, expectations, and appraisal. *Journal of Adolescence*, **18**, 403-425.
- Grolnick, W. S., Ryan, R. M., & Deci, E. L. (1991). Inner resources for school achievement: Motivational mediators of children's perceptions of their parents. *Journal of Educational Psychology*, **83**, 508-517.
- Jessor, S., & Jessor, R. (1975). Transition from virginity to nonvirginity among youth: A social psychological study over time. *Developmental Psychology*, **11**, 473-484.
- Jöreskog, K. G., & Sörbom, D. (1993). *LISREL-8 (computer manual)*. Chicago, IL: Scientific Software.
- Loewenstein, G., & Furstenberg, F. (1991). Is teenage sexual behavior rational? *Journal of Applied Social Psychology*, **21**, 957-986.
- Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin*, **103**, 391-410.

- Miller, B. C., & Olson, T. D. (1988). Sexual attitudes and behaviour of high school students in relation to background and contextual factors. *Journal of Sex Research*, **24**, 194-200.
- Rotheram-Borus, M. J., Reid, H., Rosario, M., & Kasen, S. (1995). Determinants of safer sex patterns among gay/bisexual male adolescents. *Journal of Adolescence*, **18**, 3-15.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external locus of control of reinforcement. *Psychological Monographs*, **80**(609), 1-28.
- Sanderson, C. A., & Jemmott, J. B. (1996). Moderation and mediation of HIV-prevention interventions: Relationship status, intentions, and condom use among college students. *Journal of Applied Social Psychology*, **26**, 2076-2099.
- Sneddon, I., & Krenan, J. (1992). Sexual behavior and attitudes of university students in Northern Ireland. *Archives of Sexual Behavior*, **21**, 295-312.
- Taris, T. W. (1997). On selectivity of nonresponse in discrete-time, multi-wave panel studies. *Quality & Quantity*, **31**, 79-94.
- Taris, T. W., & Semin, G. R. (1995). Does adolescent sexual behaviour affect their attitudes concerning sex? *International Journal of Adolescence and Youth*, **5**, 139-156.
- Taris, T. W., & Semin, G. R. (1997a). Gender as a moderator of the effects of the love motive and relational context on sexual experience. *Archives of Sexual Behavior*, **26**, 159-180.
- Taris, T. W., & Semin, G. R. (1997b). Parent-child interaction during adolescence, and the adolescent's sexual experience: Control, closeness, and conflict. *Journal of Youth and Adolescence*, **26**, 373-398.
- Taris, T. W., Semin, G. R., & Bok, I. A. (1998). Quality of family interaction and intergenerational transmission of values: The case of sexual permissiveness. *Journal of Genetic Psychology*, **159**, 237-250.
- Træn, B., & Lewin, B. (1992). Casual sex among Norwegian adolescents. *Archives of Sexual Behavior*, **21**, 253-269.